

Abstract

An object of the present invention is to provide an air refrigerant cooling apparatus having magnetic bearings with high reliability and high efficiency. In the present invention, magnetic bearings are applied to a motor of an air refrigerant cooling apparatus which includes a compressor, the motor and an expansion turbine. To remove contamination moving into the inside of the motor from the outside through a labyrinth, a pressure difference is generated between the inside of the motor and the compressor. Thus, high-speed rotation is kept, and an air refrigerant cooling apparatus with high reliability and high efficiency can be attained. Provided near the magnetic bearings are sensors for detecting positions of the shaft in the radial and the axial directions. To prevent the sensors from being exposed to the air refrigerant leaked from the compressor and the expansion turbine through labyrinth, a pressure difference is also generated between the space where the sensors are provided and the outside of the motor. Thus, the sensor operation is stabilized.

An air refrigeration system having high reliability and high efficiency with a simple configuration is attained by incorporating the

air refrigerant cooling apparatus into a refrigeration system.